

REMARKS/ARGUMENTS

The Office Action mailed August 12, 2003 has been carefully reviewed. The Office Action was non-final. Reconsideration of this application in view of the following remarks is respectfully requested. Previously Amended claims 1-6 are presented for continuing examination. Claims 7-9 are cancelled.

Previous Rejections

In numbered paragraphs 1, 2, 3, 5, and 6 of the Office Action mailed August 12, 2003 previous rejections were withdrawn.

35 USC 103 Rejection - McBride et al in view of Becker et al

In numbered paragraph 4 of the Office Action mailed August 12, 2003, the rejection of claims 1-6 under 35 USC 103§(a) as being allegedly being unpatentable over the McBride et al reference (US 6,296,752), in view of the Becker et al reference (US 6,287,832), and the Bakewell et al reference ("Characterization of the dielectrophoretic movement of DNA in mico-fabricated structures") as stated in the May 8, 2003 Office Action was maintained. Claims 1, 3, and 6 were amended after the May 8, 2003 Office Action.

The McBride et al reference (US 6,296,752) shows an apparatus for separating, in a medium, a component from a composition comprising: (1) an array of three or more electrodes arrayed along a pathway along which molecules of the composition are transported; and (2) a power source device for delivering to voltage to the electrodes; wherein the voltages delivered to the electrode array by the power source device are effective to: (a) alter the relative movement along the transport pathway of two or more of the molecules caused by a motive force, or (b) cause the molecules to move along the transport pathway.

The Becker et al reference (US 6,287,832) shows apparatus and methods for the separation, characterization, and manipulation of matter. In particular, the invention combines the use of frequency-dependent dielectric and conductive properties of particulate matter and solubilized matter with the properties of the suspending and transporting medium to discriminate and separate such matter. The apparatus includes a chamber having at least one electrode element and at least one inlet and one output port into which cells are introduced and removed from the chamber. Matter carried through the chamber in a fluid stream is then displaced within the fluid by a dielectrophoretic (DEP) force caused by the energized electrode. Following displacement within the fluid, matter travels through the chamber at velocities according to the velocity profile of the chamber. After the matter has transmitted through the chamber, it exits at the opposite end of the chamber at a characteristic position. Methods according to the invention involve using the apparatus for discriminating and separating matter for research, diagnosis of a condition, and therapeutic purposes.

The Bakewell et al reference shows a 1 cm x 0.5 cm array of parallel wires. The entire area was divide in 8 separate electrodes sets, each of which could be addressed with a different frequency as shown in figure 1. They were powered using an AC voltage up to 20V peak to peak over the frequency range 1Hz-20MHz.

Applicants respectfully traverse the rejection of claims 1-6 as allegedly being unpatentable over the McBride et al reference in view of the Becker et al reference and the Bakewell et al reference. For example, the invention defined by claim 1 comprises an apparatus for dielectrophoretic concentration of particles under electrokinetic flow and collecting said particles in a microfluidic channel

using a combination of dielectrophoresis and electrokinetic/electroosmotic flow.

The apparatus comprises a combination of the following structural elements:

- a microfluidic channel section, said microfluidic channel section having a first end and a second end,

- means for producing electrokinetic flow in said microfluidic channel section by producing a DC voltage across said first end and said second end of said microfluidic channel section,

- said means for producing electrokinetic flow in said microfluidic channel section by producing a DC voltage across said first end and said second end of said microfluidic channel section comprising

- a positive electrode connected to said first end of said microfluidic channel section and

- a negative electrode connected to said second end of said microfluidic channel section and

- a DC power supply connected to said positive electrode and said negative electrode,

- at least one pair of interdigitated electrodes located on a surface of said microfluidic channel,

- said interdigitated electrodes comprising a first electrode plate having first electrode projecting legs and a second electrode plate having second electrode projecting legs, said first electrode projecting legs and said second electrode projecting legs interlaced, and

- means for producing said combination of dielectrophoresis and electrokinetic/electroosmotic flow by producing an AC voltage across said interdigitated electrodes, said means for producing said combination of dielectrophoresis and electrokinetic/electroosmotic flow comprising

- an AC power supply connected to said interdigitated electrodes comprising

- said first electrode plate having first electrode projecting legs and

- said second electrode plate having second electrode projecting legs

- which sets up a non-uniform electric field proximate said first electrode plate having first electrode projecting legs and said second electrode plate having second electrode projecting legs, said non-uniform electric field collecting said particles.

None of the three references, McBride et al, Becker et al, or Bakewell et al, show an apparatus that provides dielectrophoretic concentration of particles under electrokinetic flow and collecting said particles in a microfluidic channel using a combination of dielectrophoresis and electrokinetic/electroosmotic flow. Further, none of the three references, McBride et al, Becker et al, or Bakewell et al, show the combination of elements of the claimed invention.

Under MPEP §2142, there are three requirements to establish a prima facie case of obviousness. (1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. (2) There must be a reasonable expectation of success. (3) The prior art reference (or references when combined) must teach or suggest all the claim limitations. It should be noted that the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants respectfully submit that the rejection fails under the obviousness test. The rejection fails under prong 1 of the obviousness test because there is no suggestion or motivation in the prior art to combine the McBride et al, Becker et al, and/or Bakewell et al references.

Three references, McBride et al, Becker et al, or Bakewell et al, fail to show the combination of structural elements of the claims forming an apparatus that provides dielectrophoretic concentration of particles under electrokinetic flow and collecting said particles in a microfluidic channel using a combination of dielectrophoresis and electrokinetic/electroosmotic flow. Under MPEP §2143.01, "obviousness can only be established by combining or modifying the teachings

of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

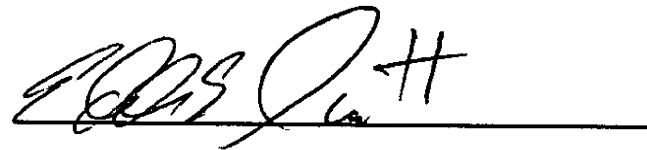
Applicants respectfully submit that the rejection also fails under the second prong of the obviousness test because there is no reasonable expectation of success of the hypothetical combination. The apparatus of the primary McBride et al reference alters the relative movement along the transport pathway of two or more of the molecules caused by a motive force, or causes the molecules to move along the transport pathway. To alter the apparatus of the primary McBride et al reference in some fashion based upon the secondary Becker et al, and/or Bakewell et al references would not have any reasonable expectation of success.

Applicants respectfully submit that the rejection also fails under the first and third prong of the obviousness test because only through impermissible hindsight would motivation be found to combine the McBride et al, Becker et al, and/or Bakewell et al references. MPEP §2142 states, “the tendency to resort to ‘hindsight’ based upon applicant’s disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.” Also, under MPEP §2143.01, “the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

SUMMARY

The undersigned respectfully submits that the rejections of the claims raised in the Office Action mailed August 12, 2003 have been fully addressed and overcome, and the present application is believed to be in condition for allowance. It is respectfully requested that this application be reconsidered, that the claims be allowed, and that this case be passed to issue. If it is believed that a telephone conversation would expedite the prosecution of the present application, or clarify matters with regard to its allowance, the Examiner is invited to call the undersigned attorney at (925) 424-6897.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Eddie E. Scott", is written over a horizontal line.

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